

position of the body of the bird to the plane of the horizon is observable. The miracle is always performed by the use of the appropriate means.

ARGYLL

Cannes, February 12

I AGREE with "J. R." that the term "hovering" is likely to be misunderstood. I used it because it had been used in the earlier correspondence in *NATURE* to which I referred. If "J. R." (or any other of your correspondents on this subject) has never seen a hawk hanging in motionless poise above a hillside, I would ask leave to refer him to *NATURE*, vol. viii. pages 86 and 324, for a description of the act.

February 19

HUBERT AIRY

I HAD once a very unusual opportunity of observing accurately the flight of buzzards, from the summit of Acro-Corinthus. As this unique natural fortress rises sheer from the plain, on the side toward Attica, to the height of eighteen or nineteen hundred feet, a group of these birds, hanging at that height above the surface, were thus brought in a line with the eye. I could detect the minutest movement of wings or tail. Again and again there were considerable intervals, of many seconds' duration, during which one bird and another would hang, with pinions horizontally outstretched, absolutely motionless, neither descending nor drifting, but as if his balance in the air were one of delicately adjusted equipoise. And when, by a just perceptible movement of wing, he stirred again, it seemed rather to be to change his position than that he needed any kind or degree of effort to maintain it. The kestrel is an unfortunately chosen bird for Mr. Hubert Airy's observation, because though it hangs for a minute or two over the same spot watching its prey, it is always "by short and rapid motion of its wings"; from which fanning motion it has acquired, I think, its popular name of windhover, and not because, as Mr. Airy supposes, it is upborne by the wind. But were my Corinthian buzzards upborne by the wind? There was none. The day was one of dead calm. No doubt of necessity there was some upward current of air from the sun-warmed surface of the ground by which the birds profited; but if at all sufficient to sustain them, their actual gravity, when in that position and so willing it (by which I mean nothing so absurd as that gravitation can be counteracted by the *vis viva*, but that by inflating its lungs, and perhaps suspending its respiration, the bird may have the power at will of lessening its comparative weight in the air), must be very near to that of the atmosphere around and underneath them. It is evident that Mr. Airy could only claim my observation as being in favour of his theory if there had been a breeze from Attica striking against the face of the citadel. There was none perceptible; and I drew the attention of my companions to the curious problem presented by such an ease of flight.

HENRY CECIL

Bregner, Bournemouth, February 13

P.S.—Will you allow me just to mention that the letter reprinted from *NATURE* by Dr. George J. Romanes in his "Animal Intelligence," as mine, is by Mr. Merlin, our present Consul in Athens. I sent it, but he wrote it, and the observation is wholly his.

The Auroral Meteoric Phenomena of November 17, 1882

MR. BACKHOUSE remarks in his letter (*NATURE*, vol. xxvii. p. 315): "It would be well to ascertain whether such a motion (in a curve) would not agree better with the observations of the beam than Dr. Groneman's hypothesis that it was a straight line."

When a straight line lies within or without the (celestial) sphere, on whose surface we wish to trace the perspective projection of that line (the eye being placed in the centre of the sphere), the perspective of the line will of course always be a great circle. When inversely the apparent path of the same meteor, seen from *one* place of observation is a great circle, the true path must lie in a plane. When the apparent paths, seen at the same time from two different places, not situated in the direction of the apparent path, are both great circles, the true path lies in two different planes, and *must be a straight line*. Now Prof. Oudemans at Utrecht says positively that the apparent path of the phenomena of November 17 was a great circle, cutting the horizon (and also the equator) in two opposite points. Of the English observers I will cite Mr. Saxby (p. 86), who describes "the trajectory as much flatter than that of the

stars." Moreover the general fact is, as I proved in my paper, that this trajectory, having been seen of regular form and consequently probably of equal curvature in its whole length, intersected the great circle of the horizon in two opposite points, and therefore must have been a great circle itself. The above-mentioned condition being fulfilled, I was under the necessity of taking the true path as a right one. I think this peculiarity indicates the meteoric nature of the phenomenon and of all the auroral arcs (*les arcs proprement dits* of my theory) showing as great circles of the sphere. In fact a curve cited by Mr. Backhouse, lying at equal height above a terrestrial parallel, will show itself *but in one case* as a great circle, namely where the observer is within its plane. From all other places it will be seen as a small circle of the sphere. In this case is the apparent boundary of an aurora in the north, the arch of the dark segment cutting the horizon in two not opposite points.

I dare not occupy more space to answer Mr. Backhouse further on the influence exercised by cosmic matter on terrestrial magnetism, and the consequence of the general direction east to west of these currents when passing in the neighbourhood of the earth, but I think that this direction east to west *must* be deduced from the observed facts.

I am much obliged to Messrs. Petrie and Muirhead for their information. As to the remark of the former on the spectrum observed by Dr. Rand Capron, I think that the auroral character of some phenomena will be proved the best when it shows the auroral lines, whatever may be the origin of its light. When its other properties point out its meteoric character, a strong argument is found in favour of the cosmic theory of aurora.

H. J. H. GRONEMAN

Groningen, Netherlands, February 14

The Orbit of the Great Comet of 1882

I AM very much obliged to those gentlemen who have kindly given me the information required in my letter published in *NATURE*, vol. xxvii. p. 314.

They all agree on the same point, which confirms my opinion that in all the good observations the same or very nearly the same point of the head was observed during the brightest appearance of the comet.

I remarked especially in the sketches shown to me by Mr. A. A. Common, who was the first to see the comet in England, on September 16, and who continually made careful observations of it, that, although the nucleus was seen since October 30 divided into two parts, always one of these (which I shall call the main part next to the following end of the nucleus) remained the brightest. Mr. Common in every drawing marks this part with the word "brightest." At the Washington Observatory also this same bright point was always observed with the transit instrument, as it is stated by Mr. W. C. Winlock in his letter (*NATURE*, vol. xxvii. p. 129).

Mr. W. L. Elkin, Cape Observatory, in a communication to the *Astronomische Nachrichten*, No. 2490, speaks about this orbit. He used the first observation made at the Cape on September 8, the observation [of the] disappearance of the comet at the sun's limb on the 17th of the same month, and a normal observation on November 17, to calculate either a parabolic orbit or an elliptic one; but none of these gave the positions of the comet according to intermediate observations.

Mr. Elkin believes it is possible to take as the most probable value of $\frac{1}{a}$ the value 0.0075, and consequently the comet has a

very long period, while Mr. Morrison in his calculation of the orbit had $e = 0.9998968$, and a period of 652.5 years.

As errors of observations are of course inadmissible, it is now the question to study what produces such great differences in calculating the orbits.

Are they due to disturbances during the comet's passage through the solar system, and especially at its passage through the sun's corona? or are they due to the hypothesis specified by Mr. Elkin and others that the centre of the nucleus is not the point gravitating around the sun? This question cannot be decided but by a careful discussion of all the positions of the comet during the whole period.

The observations before perihelion are of course very important. Unfortunately at the Cape the astronomers were prevented making observations between September 8 and September 17 because of bad weather; but there are some observations made in Melbourne and in other observatories before September

17; and besides, the important observation of the disappearance of the comet at the sun's limb is very valuable. Now then, if it will be possible to secure some observations in the remaining days the comet will be visible, I am sure we shall have a large amount of material to study upon.

I may add that Mr. Common and I saw the comet a few days ago. With magnifying power of 120 and 150 we were not able to distinguish the division of the nucleus, but with a higher power we saw five bright points; one of these, corresponding to that seen before, remains the brightest. The comet has all the appearance of a little curve convex to the horizon, and is still a very bright object, as Mr. Common was able to see it pretty well with only six inches aperture and in moonlight.

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Aino Ethnology

LET me hasten to assure Herr Rein that nothing could have been further from my intention than to question the "love of truth," which is conspicuous in his work on Japan. I trust he will consider as absolutely withdrawn any expression of mine which he fancies might at all bear such a construction. His authorities I did not quote, because I attached much more importance to the weight of his name than to theirs. The almost unanimous opinion of original observers is opposed to their conclusions, which I was certainly somewhat surprised to find adopted by Herr Rein. But as he has not himself visited the Aino people, the question of their affinities need not be further argued here. I may state, however, that to Steube and von Siebold must now be added Herr Kreitner, of the Szechenyi expedition, who emphatically removes them from the Mongolic, and "assimilates them to the Caucasian type" ("Im Fernen Osten," Vienna, 1881, p. 318).

A. H. KEANE

Auroral Experiments in Finland

IN the note in NATURE, vol. xxvii. p. 322, in which you refer to my telegrams from Sodankylä, there is a misunderstanding concerning the apparatus which I made use of in the experiments. This apparatus, which I call in Swedish "Uttömnings-apparat" (streaming apparatus), was constructed of uncovered copper wire, provided at each half-metre with fine erected points. That wire was led in slings to the top of the hill, and reposed on the usual telegraph insulators. From one end of this wire was conducted a covered copper wire on insulators to the foot of the hill (600 feet high), and there joined a plate of zinc interred in the earth. In this circuit was put a galvanometer.

It was this apparatus which produced both the yellow-white halo at Oratunturi and the straight beam of aurora borealis at Pietarintunturi, as the positive current in the galvanometer at both places. The terrestrial current diminishes (or ceases) below the belt of maxima of the aurora borealis.

S. LEMSTRÖM

Helsingfors

Flamingoes and Cariamas

IN NATURE, vol. xxvii. p. 334, an account is given of the curious behaviour of a flamingo towards a caria. May I point out that this habit of the flamingo was observed in 1869 by Mr. Bartlett, and will be found in a P.S. to a paper of his entitled "Remarks upon the Habits of the Hornbills," read before the Zoological Society, February 25, 1869. The liquid was examined by Dr. Murie, and is said to have consisted almost entirely of blood. A short notice of the habit, communicated by Mr. Bartlett, appears also in Buckland's Edition of "White's Selborne."

JAMES CURRIE

Cambridge, February 19

THE APPROACHING FISHERY EXHIBITION

FROM the cheerful note of preparation which is now being sounded, we presume the opening of the International Fisheries Exhibition will take place punctually on the day which has been fixed for that event—May 1. That the Exhibition will be successful, both in a pecuniary sense and as an exposition of fishery economy and of the natural history of our food fishes, may, we think, be even now predicted. The two exhibitions by

which it has been preceded, those of Edinburgh and Norwich, not only paid all expenses, but left a handsome surplus; so that, with the vast population of London and the strangers who daily come within its gates to work upon, the promoters of the exposition are warranted in believing that it will prove a success. It will undoubtedly be the greatest affair of the sort which has yet been designed, and will occupy a site twice as large as the Norwich and Edinburgh exhibitions joined together. The fishery exhibition which was held at Berlin three years ago was visited by nearly half a million persons, but it was only open for ten weeks, whilst the show to be held at South Kensington will remain open for six months, and as the population of London is more than four times greater than that of Berlin, we may calculate on the visitors to the Fishery Exhibition running into big figures;—two million persons at a shilling each would represent a sum of one hundred thousand pounds. Already a large guarantee fund has been subscribed by corporations and private persons, and there is no reason why Parliament should not be asked for a grant in aid, although any money that might be granted may not be required. It is right to say that as a nation we play a rather "mean" part in such matters, and are quite outdone in liberality by other countries. America, for instance, is sending us an "exhibit" which will cost that country ten thousand pounds, and other foreign countries are acting in an equally liberal spirit. If we were asked on any occasion to reciprocate, what answer could we make? We have positively nothing that we could send. With the exception of the toy museum left to the country by Mr. Frank Buckland, we possess nothing in the shape of a national collection illustrative of fishery economy; hence the Exhibition which is about to open assumes very much the shape of a commercial enterprise, and becomes a gate-money show. But that is better than nothing, and it is to be hoped that from the debris of the approaching exposition a substantial addition may be made to the Buckland Museum of economic fish culture, and if we may be permitted to make such a suggestion, the aquarium should, if that is possible, be so arranged that it could be left as a permanent attraction for all who are interested in the natural history of fish and in the proper ingathering of the harvest of the sea.

Great expectations are entertained as to the value of the lessons to be taught at the approaching Exhibition. We are undoubtedly in need of knowledge of all kinds regarding the natural history of our fishes. From the whitebait to the whale we are singularly deficient in those details of fish life that would prove valuable to persons engaged in fishery enterprise. In the matter of well-planned investigation into the natural history of the British food fishes we are far behind America, where information of the most valuable kind is systematically collected and disseminated. As a matter of fact, we have (as a nation) done almost nothing in respect of adding to the knowledge of the public. Some individuals have been toying with the subject of *Pisciculture*, whilst in the seas that pertain to the United States fish-breeding on an extended scale has been long in operation under the auspices of the Government. It will not be the fault of the promoters of the approaching Exhibition if attention is not aroused to our want of interest (as a people) in the sea-fisheries of the country. We have therefore every reason to be grateful to those who have stepped to the front in order to promote this enterprise; the men who have assumed the lead have nothing to gain personally by its success—they are working in the interests of the public, knowing well that the fisheries of the surrounding coasts contribute largely to the commissariat of the country.

A portly prospectus, so far as its contents are concerned, has been issued, indicative of what will be shown in the Exposition, and from that document we gather that a large